FIG. 1

CONSTRUCTION OF IEEE 1394 BUS TO WHICH
CONVENTIONAL BUS ANALYZER IS CONNECTED
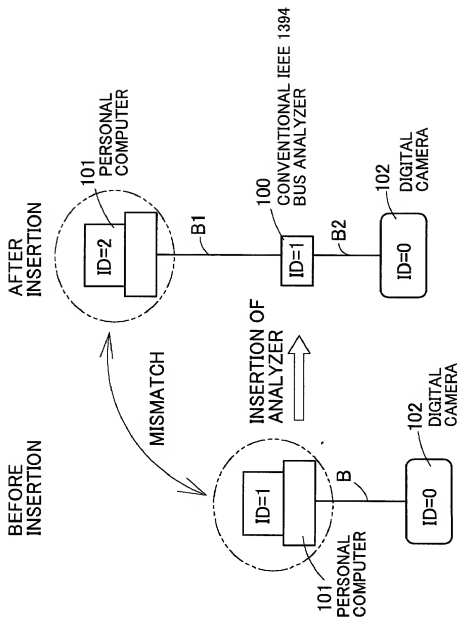
FIG. 2

CONSTRUCTION IN WHICH CONVENTIONAL BUS ANALYZER IS
CONNECTED TO IEEE 1394 BUS TO WHICH A NUMBER OF
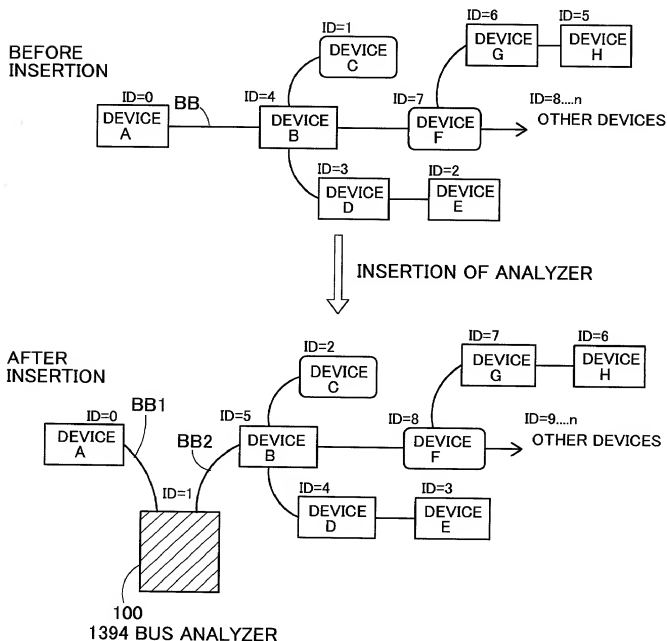DEVICES ARE CONNECTED

FIG. 3 CONSTRUCTION IN WHICH BUS ANALYZER OF FIRST EMBODIMENT IS CONNECTED TO IEEE 1394 BUS
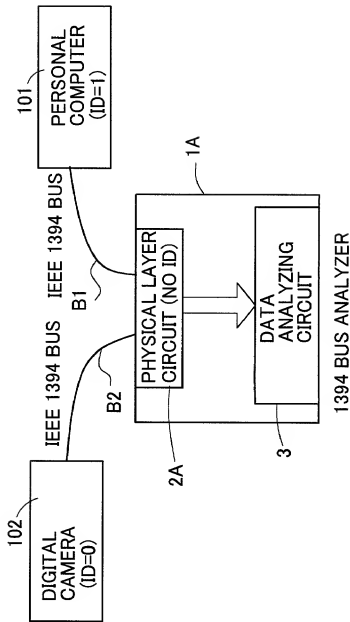

PERSONAL COMPUTER (ID=1) 101

DIGITAL CAMERA (ID=0) 102

IEEE 1394 BUS B1

IEEE 1394 BUS B2

PHYSICAL LAYER CIRCUIT (NO ID) 2A

DATA ANALYZING CIRCUIT 3

1394 BUS ANALYZER 1A

FIG. 4

STATE TRANSITION DIAGRAM SHOWING TREE—IDENTIFYING OPERATIION
IN FIRST EMBODIMENT

END OF BUS RESET

S1
T0:
TRANSMISSION OF IDLE

TIMEOUT

S2
RECEIVE PARENT_NOTIFY BY ONE PORT ||
RECEIVE PARENT_NOTIFY BY BOTH PORTS

S4
RECEIVE CHILD_HANDSHAKE

S3
RECEIVE PARENT_NOTIFY BY BOTH PORTS :
OUTPUT CHILD_NOTIFY TO ARBITRARY PORT
RECEIVE PARENT_NOTIFY BY ONE PORT :
OUTPUT CHILD_NOTIFY TO THE PORT

S5
T2:
OUTPUT PARENT_NOTIFY TO THE
OTHER PORTS

S6
RECEIVE PARENT_HANDSHAKE

SELF-IDENTIFY

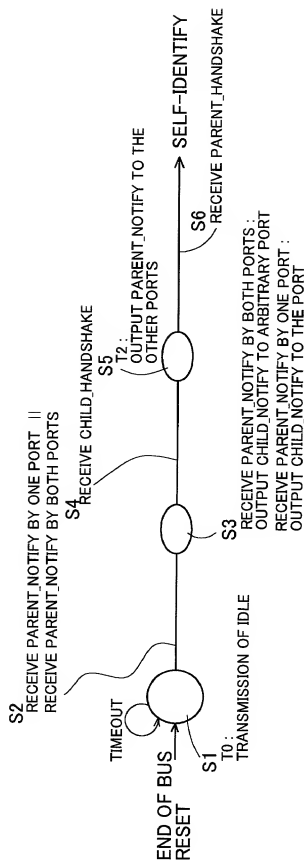# FIG. 5

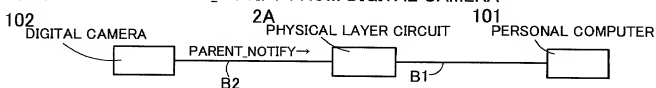STATE TRANSITION DIAGRAM SHOWING SELF-IDENTIFYING
OPERATION IN FIRST EMBODIMENT

- PARENT : PORT HAVING HIGH ARBITRATION
- CHILD : PORT HAVING LOW ARBITRATION

S7 TRANSMISSION OF IDLE

END OF TREE IDENTIFICATION

S8 RECEIVE SELF_ID_GRANT BY PARENT

S9 OUTPUT SELF_ID_GRANT TO CHILD

S10 RECEIVE SELF_ID BY CHILD

RECEIVE SELF_ID BY PARENT

END OF SELF_ID

S11 OUTPUT IDLE && RECEIVE AND TRANSFER SELF_ID

S12 RECEIVE IDENT_DONE BY CHILD

RECEIVE SELF_ID BY CHILD

S13
- OUTPUT IDENT_DONE TO PARENT
- TRANSFER SPEED SIGNAL RECEIVED BY CHILD TO PARENT
- TRANSFER SPEED SIGNAL RECEIVED BY PARENT TO CHILD PORT
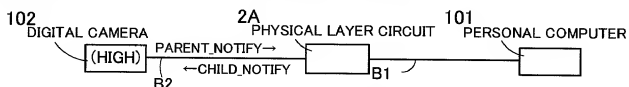
S14 RECEIVE SELF_ID BY PARENT

NORMAL ARBITRATION

FIG. 6

TREE-IDENTIFYING OPERATION IN FIRST EMBODIMENT
(RECEIVE PARENT_NOTIFY BY ONE OF PORTS)

(P1) RECEIVE PARENT_NOTIFY FROM DIGITAL CAMERA
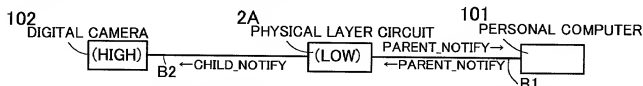
102 DIGITAL CAMERA 2A PHYSICAL LAYER CIRCUIT 101 PERSONAL COMPUTER

PARENT_NOTIFY→
B2   B1

(P2) OUTPUT CHILD_NOTIFY TO DIGITAL CAMERA

102 DIGITAL CAMERA 2A PHYSICAL LAYER CIRCUIT 101 PERSONAL COMPUTER

(HIGH) PARENT_NOTIFY→
←CHILD_NOTIFY
B2   B1

(P3) RECEIVE CHILD_HANDSHAKE BY STOPPING OUTPUT
OF PARENT_NOTIFY FROM DIGITAL CAMERA

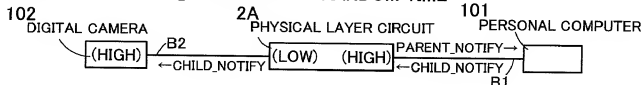102 DIGITAL CAMERA 2A PHYSICAL LAYER CIRCUIT 101 PERSONAL COMPUTER

(HIGH) (LOW)
←CHILD_NOTIFY
B2   B1
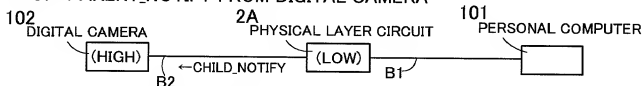
(P4) OUTPUT PARENT_NOTIFY TO THE OTHER PORT RECEIVE
ROOT_CONTENTION WHEN PERSONAL COMPUTER ALSO OUTPUTS
PARENT_NOTIFY AT THIS TIME

102 DIGITAL CAMERA 2A PHYSICAL LAYER CIRCUIT 101 PERSONAL COMPUTER

(HIGH) (LOW) PARENT_NOTIFY→
B2 ←CHILD_NOTIFY   ←PARENT_NOTIFY
B1

(P5) STOP OUTPUTTING PARENT_NOTIFY FROM PERSONAL COMPUTER
BUT CONTINUOUSLY OUTPUT PARENT_NOTIFY FROM PHYSICAL
LAYER CIRCUIT

102 DIGITAL CAMERA 2A PHYSICAL LAYER CIRCUIT 101 PERSONAL COMPUTER

(HIGH) B2 (LOW) PARENT_NOTIFY→
←CHILD_NOTIFY   B1
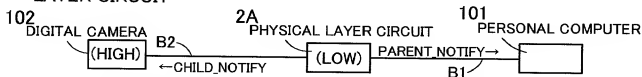
(P6) RECEIVE PARENT_HANDSHAKE WHEN PERSONAL COMPUTER
OUTPUTS CHILD_NOTIFY AFTER RANDOM TIME

102 DIGITAL CAMERA 2A PHYSICAL LAYER CIRCUIT 101 PERSONAL COMPUTER

(HIGH) B2 (LOW) (HIGH) PARENT_NOTIFY→
←CHILD_NOTIFY   ←CHILD_NOTIFY
B1

(P12) STOP OUTPUTTING SIGNALS FROM BOTH PORTS, THEREBY
FINISHING TREE-IDENTIFYING OPERATION

102 DIGITAL CAMERA 2A PHYSICAL LAYER CIRCUIT 101 PERSONAL COMPUTER
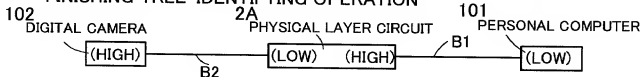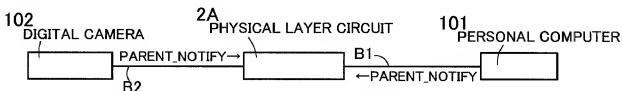
(HIGH) (LOW) (HIGH) B1 (LOW)
B2

FIG. 7

TREE–IDENTIFYING OPERATION IN FIRST EMBODIMENT
(RECEIVE PARENT_NOTIFY BY BOTH PORTS)

(P7) RECEIVE PARENT_NOTIFY FROM BOTH DEVICES

102 DIGITAL CAMERA — 2A PHYSICAL LAYER CIRCUIT — 101 PERSONAL COMPUTER
PARENT_NOTIFY→ B1
←PARENT_NOTIFY
B2

(P8) OUTPUT CHILD_NOTIFY TO DIGITAL CAMERA

102 DIGITAL CAMERA — 2A PHYSICAL LAYER CIRCUIT — 101 PERSONAL COMPUTER
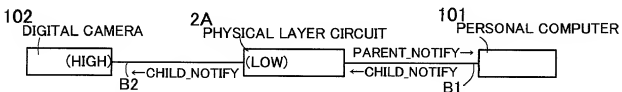(HIGH) PARENT_NOTIFY→ B1
←CHILD_NOTIFY ←PARENT_NOTIFY
B2
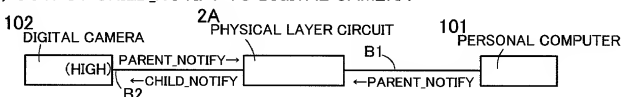
(P9) STOP OUTPUTTING PARENT_NOTIFY FROM DIGITAL CAMERA TO
THEREBY RECEIVE CHILD_HANDSHAKE, AND OUTPUT PARENT_NOTIFY
TO PERSONAL COMPUTER.
RECEIVE ROOT_CONTENTION WHEN PERSONAL COMPUTER ALSO
OUTPUTS PARENT_NOTIFY AT THIS TIME.
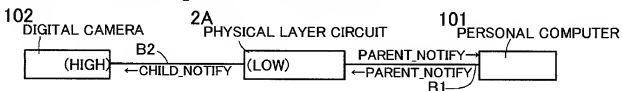
102 DIGITAL CAMERA — 2A PHYSICAL LAYER CIRCUIT — 101 PERSONAL COMPUTER
(HIGH) B2 ←CHILD_NOTIFY (LOW) PARENT_NOTIFY→
←PARENT_NOTIFY
B1

(P10) STOP OUTPUTTING PARENT_NOTIFY FROM PERSONAL COMPUTER
BUT CONTINUOUSLY OUTPUT PARENT_NOTIFY FROM PHYSICAL
LAYER CIRCUIT

102 DIGITAL CAMERA — 2A PHYSICAL LAYER CIRCUIT — 101 PERSONAL COMPUTER
B2
(HIGH) (LOW) PARENT_NOTIFY→
←CHILD_NOTIFY B1
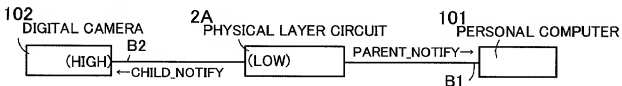
(P11) OUTPUT CHILD_NOTIFY FROM PERSONAL COMPUTER AFTER
RANDOM TIME, THEREBY RECEIVING PARENT_HANDSHAKE

102 DIGITAL CAMERA — 2A PHYSICAL LAYER CIRCUIT — 101 PERSONAL COMPUTER
B2
(HIGH) (LOW) PARENT_NOTIFY→
←CHILD_NOTIFY ←CHILD_NOTIFY B1

(P12) FINISH TREE–IDENTIFYING OPERATION

102 DIGITAL CAMERA — 2A PHYSICAL LAYER CIRCUIT — B1 101 PERSONAL COMPUTER
(HIGH) (LOW) (HIGH) (LOW)
B2